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REPORT

GATLING GOLD AND SILVER MINES,

IN THE TOWNSHIP OF MARMORA, ONT.

BY PROF. E. J. CHAPMAN, PH. D., &C.

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ON

GATLING GOLD AND SILVER MINES,

BY
PROFESSOR E. J. CHAPMAN.

[This Report is drawn up in condensed form under the following heads :—(1) Preliminary Remarks; (2) Site and general description of the Property; (3) Mineral features; (4) Result of Assays; (5) Buildings, Mining Plant, and Piled Ore, upon the property; (6) Proposed system of mining, and general conclusions.]

(1) *Preliminary Remarks.*—Having received instructions from the Directors of the GATLING GOLD AND SILVER MINING COMPANY to examine their property in Marmora, now under development, and to furnish them with a brief report upon the same for public information, I visited the ground on the 24th and 26th of last month, (May, 1873) and I have now the honor to present a condensed statement of the results of my observations and assays. This portion of the Company's property, I may premise, has been known to me for some years, and I have already expressed a high opinion of its value, in a published article on the mineral features of the surrounding district. I have made assays of its ores from time to time, and I have never failed to obtain from any sample as a minimum value, at least fifty dollars per ton, whilst from certain pieces of the ore, I have extracted an amount of gold equivalent to more than one hundred and thirty dollars per ton. Assays made in the United States and elsewhere have shewn results of a similar character. There can be no doubt therefore as to the fact, that an enormous amount of gold

must be locked up within the limits of the property. This will be rendered evident by reference more especially to certain calculations given below.

(2) *Site and general description of the property.*—The actual property of the GATLING GOLD AND SILVER MINING COMPANY comprises altogether the following locations:—

1. A portion of Lot 9, in the 8th Concession of Marmora...12½ Acres
2. The West Half of Lot 10, in the 9th Con. of Marmora...100 Acres
3. The North Half of Lot 31, in the 6th Con. of Marmora...100 Acres
4. The North Half of Lot 26, in the 11th Con. of Marmora. 66 Acres
5. A portion of the West Half of Lot 25, in 10th Con. Marmora 35 Acres
6. The South Half of Lot 28, in the 9th Con. of Hungerford 100 Acres

The present Report refers solely to the first of the above locations, the only portion of the Company's property on which any attempts at systematic exploration and development have as yet been made. This location measures 505 feet from south to north, and nearly 1200 feet from east to west—the total area being 12½ acres. Although presenting a broken or undulating surface, it lies in the trough of a long valley, bounded on the east by the north and south range of the Red or Huckleberry Hills, and on the west by a lower but roughly parallel ridge. The essential gold-bearing belt of Marmora occupies in this district the undulating area lying between these ridges. A considerable amount of timber suitable for mining purposes and fuel occurs upon the property, and the eastern portion of the location is traversed throughout its entire length by the River Moira, an unfailing stream of water, averaging in width at the spot in question about 60 or 70 feet. West of the stream, the ground rises rapidly in a series of somewhat abrupt ridges, and it is principally along these, in a nearly north and south direction, that the gold bearing lodes occur. The location is connected with the village of Marmora, 4 miles distant, by a fair country road. From Marmora to Belleville—on the Grand Trunk Railway and the Bay of Quinte, communicating with Lake Ontario—the distance by

first-class road is 30 miles ; and to Stirling, 15 miles. From the latter, railway communication will very shortly extend to the front. A railroad and steamer have also been running for some time from Blairton, a short distance west of Marmora, to the town and port of Cobourg on Lake Ontario.

(3) *Mineral features.*—The part of Marmora on which this location occurs, is occupied by a series of gneissoid, syenitic, and other crystalline strata usually referred to the Laurentian Formation. These strata in the location under review have a general north and south strike, and their dip or underlie is uniformly towards the west at an average angle of about 40° . They are interstratified in several places with remarkable bands or lodes of auriferous mispickel, associated principally with quartz, but containing also in places small quantities of cubical pyrites, mica, calcite, magnetic iron oxide, and other substances. In addition to small strings and so-called feeders of ore, four distinct bands of workable dimensions have been traced entirely across the location from north to south, or throughout a distance of 505 feet. Although running parallel with the stratification, the bands have all the characters of regular veins, and they may practically be regarded as such.

No. 1.—The east lode, or that nearest the river—as regards present development, is the principal of these veins. I propose, in this Report, to call it the “Gatling vein.” It presents at the surface a width of a few feet only, but widens rapidly on descending. A large shaft has been sunk upon it to a depth of about 90 feet, and other openings, one of about 20 feet in depth, have been made upon it in other places. At the period of my late visit, the principal shaft was partially filled with water (mostly from the surface), but I was informed that at its lower part, it shewed a width of over 20 feet. When I examined it on a former occasion, at a depth of about 60 feet from the surface, it exhibited an evi-

dently increasing width of 16 feet. It consists essentially of a quartz gangue, carrying large quantities of solid and crystallized mispickel, with scales of mica, and here and there some layers of talcose slate, especially along the hanging wall; and it presents constantly good shews of free gold. The greater part of the gold which it contains is absorbed, however, in the mispickel, and thus requires a somewhat more elaborate process than mere amalgamation for its extraction. From the numerous trials that I have made, I do not think that any portion of the pure mispickel contains much less than 100 dollars' worth of gold to the ton, and a great deal more is present in many portions of it. The mixed ore in its crude or undressed state will necessarily shew a lower yield; but, as already stated, in fairly chosen samples I have never found less per ton than fifty dollars' worth of gold. The gold is alloyed with a small amount of silver, but the fineness is never reduced by this below 22 carats. A thin string or narrow band of ore runs along the hanging side of this vein, at a distance of a few feet to the west, the two uniting a short distance south of the location on the property of General Tuttle.

No. 2 vein has been tested with regard to its extension, &c., by shallow excavations in various parts of its course, but apart from this it remains at present undeveloped. It presents, however, the same surface features as the Gatling vein.

No. 3 is also of the same general character, as regards surface conditions and nature of ore, but a shaft has been sunk upon it to a depth of 22 feet. At this depth, the width is somewhat over three feet.

No. 4, the west vein, I purpose in this Report to call the "O'Neil vein," after Captain O'Neil, by whom the gold-bearing veins of this locality were first brought into notice, and to whose energy the development of the present mineral property is so largely due. The O'Neil vein differs in a very

marked manner from the other veins in this location, inasmuch as it is greatly decomposed, and is also mixed somewhat largely with cubical pyrites, earthy magnetic iron ore (the "eisenmulm" of German miners), a scaly red iron ore, the latter, when pure, presenting a dark steel-grey or iron-black color with red streak. This condition of the vein will cease, however, I am convinced at a comparatively moderate depth, and the ore will assume its usual character. Its dark color, and the peculiar softness of the eisenmulm when damp, have led to the supposition that it contains both silver-glance and red silver ore, but my trials have failed altogether to corroborate this. Two fire-assays and several liquid testings shewed the presence of a small amount of silver, it is true; but although the latter metal (probably from the presence of more cubical pyrites) is in rather larger proportion than in the other veins, it is entirely subordinate to the gold. Black silver ore or silver-glance contains, it must be remembered, considerably more than three-fourths of its weight of silver (strictly 87 per cent.); and red silver ore, whether the dark or light species, holds more than half its weight of that metal (60-65 per cent). If the black and red metal of the vein consisted therefore, or consisted even in part, of these minerals, it would shew an enormously preponderating amount of silver: whereas the assay button presents a light but distinct yellow color, and the silver in it is too small in quantity to admit of separation by nitric acid. A shaft is now being sunk on this vein, and at the time of my visit it had reached a depth of about 25 feet. At that depth the width was rather more than five feet. Particles of free gold appeared to be very abundant in the ore.

(4) *Results of Assays.*—The following results were obtained from samples collected very carefully, with a view to obtain the average amount of precious metal held by the undressed ore. They are thus, it must be pointed out, much

below the average yield of dressed or picked samples. Hand-dressing cannot be safely resorted to with an ore of this kind, as by that process much of the free gold might be lost: but if the ore were stamped and properly buddled, the useless quartz would readily be separated without any loss of gold; and very high results by this concentration would be obtained, with probably nearly uniform yields from all the veins. With undressed ores of this character, no two samples will shew exactly corresponding results.

Average sample from the Gatling or No. 1 vein :

Gold—3oz., 11 dwts., 4 grs. = \$73.50	} In Ton of 2000 lbs. of ore.
Silver— 5 dwts., 20 grs.	

Average sample from No. 3 vein :

Gold—3 oz., 7 dwts., 16 grs. = \$69.86	} In Ton of 2000 lbs. of ore.
Silver— 5 dwts., 6 grs.	

Average sample from the O'Neil or No. 4 vein :

Gold—2 oz., 18 dwts., 8 grs. = \$60.26	} In Ton of 2000 lbs. of ore.
Silver— 7 dwts., 0 grs.	

On a former occasion, I obtained from a small sample of the Gatling ore, which probably contained some undetected specks of free gold, no less than \$112, and from a piece of pure mispickel, \$156, per ton.

(5) *Buildings, Mining Plant, and Piled ore upon the Property.*—A number of substantial buildings, with a large amount of mill machinery and fittings, lumber and piled ore, belong to the Company's assets. The buildings at present erected, are as follows :—A neat Dwelling House and Office; a twelve-room boarding House, with stone cellars and other conveniences; a six-stall Stable; a Forge and Store-room; Powder House; a large and well constructed Mill; and a brick Condensing flue, 122 feet in length. The mill is not complete in all its arrangements, but a very small outlay would put it into working order. It measures 86 feet by 44 and has a very solid stone sub-structure. In its construction and appointments Mr. Gatling has shown great

judgment and forethought. Its principal fittings comprise : four five-stamp batteries ; a large boiler ; two vertical engines of 40 horse power each, arranged to work separately or conjointly ; two Dean forcing pumps ; and sluices and framing for pans, roasting cylinder, &c., ready to put in position. Large quantities of lumber, and square timber, shingles, bricks, &c., are also on the ground.

The amount of ore piled at the mouths of the shafts at the date of my inspection was approximatively as follows :—On vein No. 1, 2052 tons ; on vein No. 3, 50 tons ; and on the O'Neil vein, 494 tons—making a total of 2596 tons. If we assume this ore to carry, one ton with another, only fifty dollars' worth of gold per ton, the gold in the ore mined at present will be equivalent to \$129,800. If, again, we take \$30 per ton as the amount known to have been extracted by a new process from a similar ore, the heaps upon the ground represent a value of \$77,880 ; or, if we merely look to the easily extracted free gold contained in the ore, and put this at \$9 per ton, we obtain a value of \$23,364. And this ore, it must be remembered, has come out of merely two or three shafts, no drifting or stoping having as yet been done on any of the veins.

(6) *Proposed system of mining, and general conclusions.*—In working the lodes on this property, it would seem advisable to sink in each case to a clear depth of about 80 feet, and then to commence drifting and stoping upwards, so as to leave a cover of about 20 or 30 feet above the stope to allow for the surface irregularities of the ground. Below this, the drifts should be run regularly at 10 fathoms apart. As the lodes lie so near together, they might be profitably connected by crosscutting, and all the ore could then be hoisted by a main shaft in the vicinity of the mill, the pumping gear working, of course, in this shaft also.

A glance at the statements and calculations given in some of the preceding paragraphs, will fully substantiate the fact,

referred to at the commencement of this Report, as to the enormous amount of gold locked up within the limits of this location. Keeping to the four lodes at present discovered, and assuming for each of these a thickness of 10 feet from surface to a depth of 100 feet, with a mean sp. gr. of 4.0 only, and an average of fifty dollars' worth of gold per ton—it follows, that, in the run of 505 feet through the property, each 100 feet from surface (in the case of each separate lode) will contain 62,943 tons, holding in gold the actual value of \$3,147,150. Or, taking only the contents in free gold at \$9 per ton, the extraction of this being easily accomplished, we must admit for each lode and each hundred feet of depth, the value of \$566,487. These values, again, must be quadrupled to apply to the four lodes, and, even then, we only get the gold contents of the property to a comparatively limited depth. The preceding figures are thus merely offered as approximations, but they are approximations which keep strictly within the mark, and their general accuracy is undeniable.

Finally, I may be permitted to express my opinion, that although the development of this mining property has necessarily occupied much time, it has been carried on under the management of Mr. Gatling and Captain O'Neil, with great system and forethought. A moderate outlay of time and capital is now only required to bring it to completion, when very large returns from the mine will undoubtedly accrue. I have estimated that a sum of fifty thousand dollars will be amply sufficient to open up the lodes for stoping, and to put the mill and general appointments of the mine into thorough working order.

E. J. CHAPMAN, PH.D., &c.,

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TORONTO, *June 5th*, 1873.

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